SERDP
Strategic Environmental Research and Development Program
Improving Mission Readiness Through Environmental Research

US Army Corps of Engineers®

ERDP's SEMP

Ecosystem Management Project

CS-1114

Dr. Hal Balbach

U.S. Army Engineer Research and Development Center (ERDC)

SERDP Conservation In Process Review

17 April 2002

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Purpose of SEMP

- To Address Knowledge Gaps Related to Ecosystem Management on Military Lands
- To Design and Test a Long-Term Baseline Monitoring Program on DOD Lands
- To Infuse Outcomes into DOD Ecosystem Management Processes and Practices - Range Sustainability
- To Provide a Model for Similar Regional Programs (in other regions) where Military Installations Provide a Resource Base

Key Properties and Processes

(Form the Basis for SEMP Research)

Those for which fundamental understanding is required to ensure goals of sustainability can be met

- **Hydrologic flux and storage**
- **Biological productivity**
- **Biogeochemical cycling and storage**
- **Decomposition**
- **Maintenance of biological diversity**

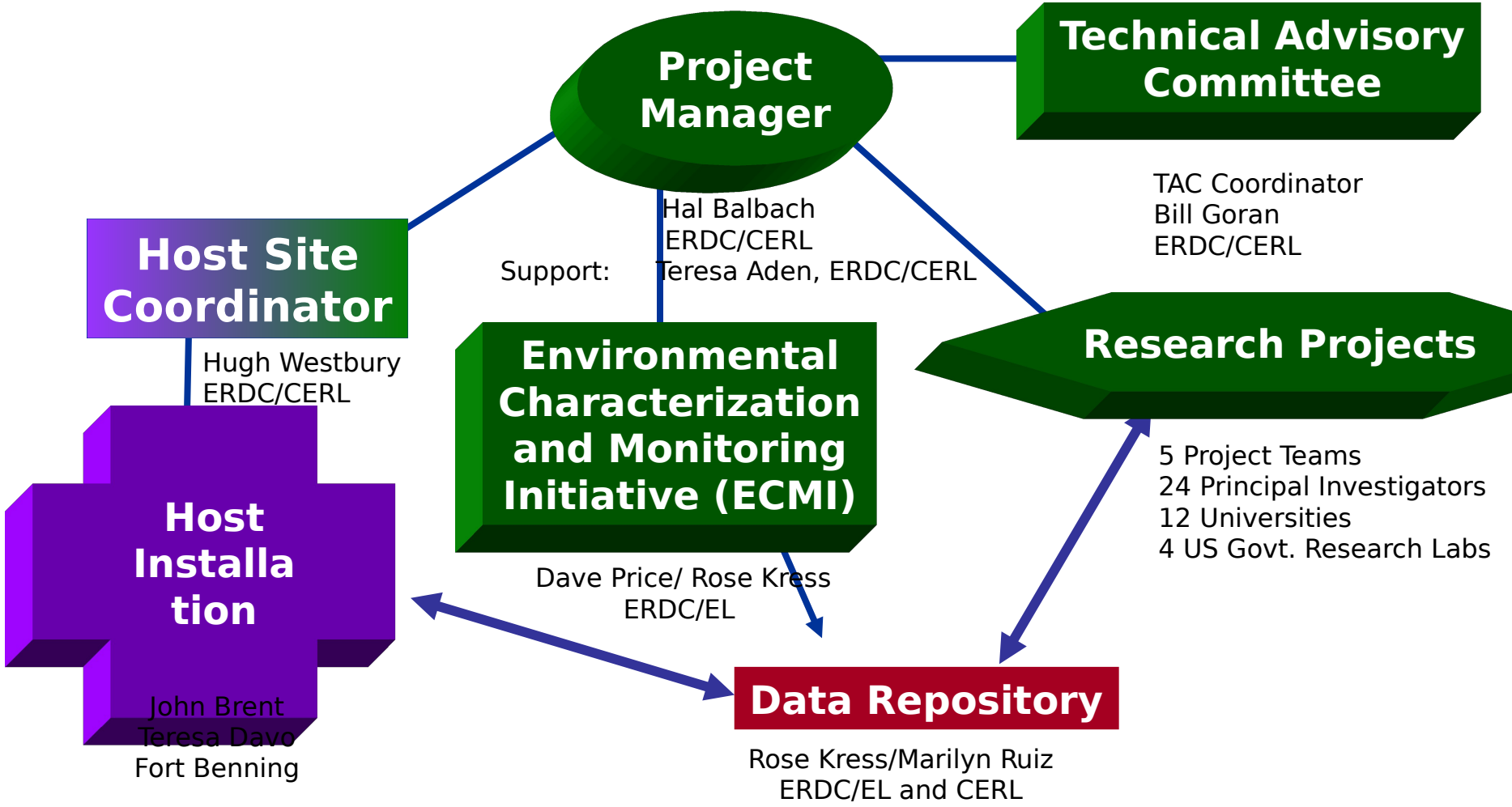
(Christensen, N.L. et. al. 1996. The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications 6(3):665-691.)

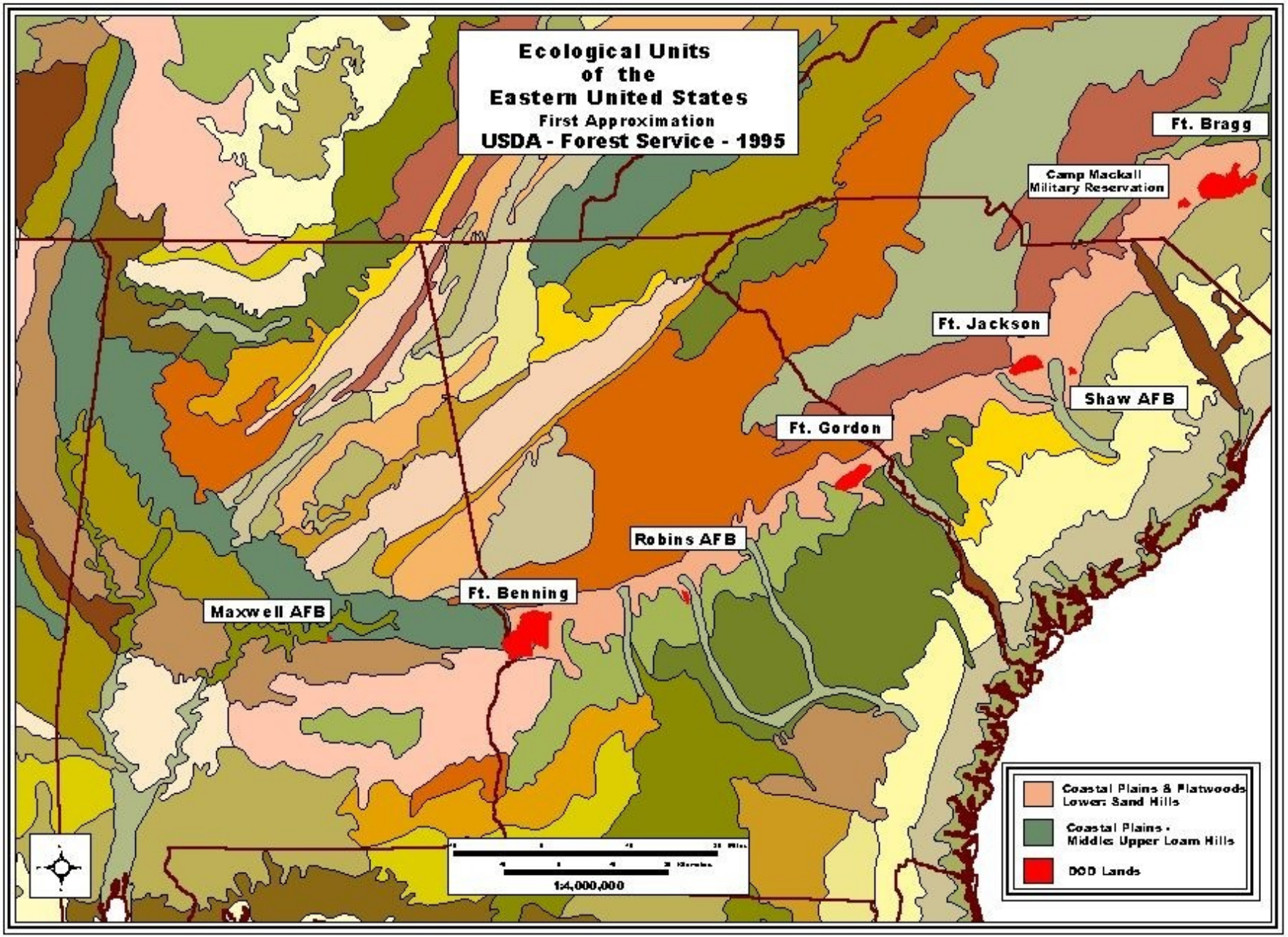
Criteria for Indicators*

- Are easily measurable
- Are sensitive to stresses of system
- Respond to stress in a predictable manner
- Signify an impending change in key characteristics of the ecological system
- Experience changes that can be averted by management actions
- Together with the full suite of indicators, provide a measure of coverage of the key gradients across the ecological systems (e.g., soils, vegetation types, temperature, etc.)
- Have a known response to natural disturbances and changes over time
- Have low variability in response

* Dale, V.H and Beyeler, S.C. 2001. Challenges in the development and use of ecological indicators. *Ecological Indicators*, v.1

SEMP Organization Chart




Ecological Units
of the
Eastern United States
First Approximation
USDA - Forest Service - 1995
Ft. Bragg
Camp Mackall
Military Reservation
Ft. Jackson
Shaw AFB
Ft. Gordon
Robins AFB
Ft. Benning
Maxwell AFB
1:4,000,000
Coastal Plains & Flatwoods
Lower Sand Hills
Coastal Plains -
Middle Upper Loam Hills
DOD Lands

SEMP Conceptual Framework

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Indicators | Thresholds | Adaptive Management

What, When, Where & How to Observe?

When & How to React?

What Might Result from Actions?

Observation Protocol

Monitoring Plan

Shared Data

Repository

Analysis Protocols

Tools

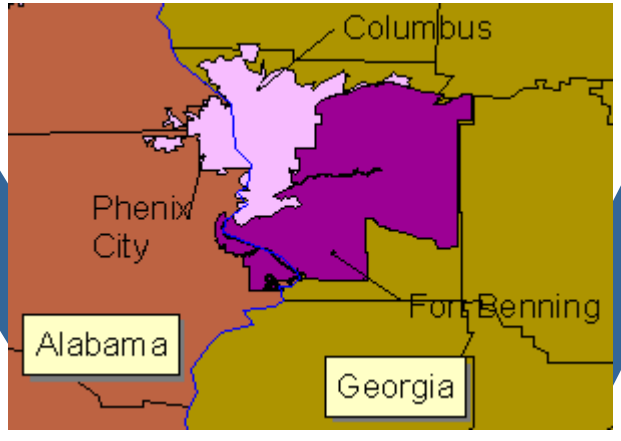
Observed Current Conditions

Desired Future Conditions

Management Actions

Use

Plans



SEMP Research Projects

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Dr. V. Dale	Indicators of Ecological Chang
Dr. W. DeBusk	Determination of Indicator Ecological Change
Dr. T. Krzysik	Development of Ecological Guilds for Land Management
Mr. C. Garten, Jr.	Disturbance of Soil Organic Matter an Nitrogen Dynamics: Implications for Soil and Water Quality
Dr. B. Collins	Thresholds of Disturbance: Land Mgmt Effects on Vegetation and Nitrogen Dynamics

The University of Georgia
Savannah River Ecology Laboratory

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Emphasis of SEMP

PHASE I 1999 - 2001 **DESIGN**	PHASE II 2002 - 2005 **ADAPT**	PHASE III 2006 - **MAINTAIN**
Extended design, implementation and documentation	Adaptation based on: a) initial monitoring results b) SEMP research results c) land management experience	Long-term maintenance and technology upgrades

Action Items - 2001 IPR

Six Followup Questions

1: "*Provide a consistent definition of high/medium/low levels of disturbance in order for the individual projects to be able to compare information.*"

2: "*the soil properties along disturbance and land use gradients need to be better defined, As they are now presented they are confusing.*"

3: "*The use and explanation of saturated hydraulic conductivity in comparisons between sites is lost.*"

4: "*Compare your inside the base data to data from outside of the base to be able to relate disturbance factors and results to regional situations.*"

5: "*Multidimensional scaling for some of the information presentation is not readily understood as presented.*"

6: "*Provide an explanation as to why 50cm water depth is required in the stream in order to perform water quality assessments.*"

Resolution of Action Items

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1 - Prepared and tested proposed methodology

- **Did not work satisfactorily**
- **Alternate plan proposed Nov 01**
- **Highest priority current action to reach closure on this problem**

2 - 6 - All related to graphic items in coverage of individual SEMP research projects

- **Project PIs answered each item following 2001 IPR**
- **White paper submitted to SERDP Program Office in July 2001**

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Budget Action Items

- April 2001 IPR and 2001 SAB resulted in additional budget requests to complete planned actions
- Special IPR 26 Sep 01 covered six items
- Four items were approved
- Total value is $190K in FY02 funding

Budget Request Summary

Topic	FY02 Approved Budget ($K)	Proposed FY02 Amount ($K)	Change ($K)	Years/Approach
Historic Land Use Photos	30	110	80	Will require $100K in FY03 to complete
Historic Data Trends*	-0-	25	25	Should be done ASAP. FY02 only
Monitoring*	300	325	25	Develop process for adding new indicators and evaluate monitoring options for carbon cycling
Repository Upgrades	50	110	60	Web enabling, user interface, others as per evaluation /priorities
Analysis/Toolbox (3 yr effort)	-0-	200	200	ECMI/R&D data analysis, model calibration/use, and land management process modeling
Fall Line Testbed	80	200	120	Extensions of R&D from host site to additional sites along the fall line
Totals	460	970	510	$120K; could be deferred to 3rd Qtr

* Item suggested as priority for SEMP in June 2001 briefing to the SERDP Scientific Advisory Board.

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Historic Land Use Photos

- Original Budget $30K
- Request for FY02 $110K
- Would be performed by ERDC-TEC
- Proposed additional effort:
  - **To prepare georeferenced coverage of Ft. Benning using historic air photo coverage**
  - **Propose one set in FY02 and one in FY03**
  - **Users request oldest coverage (1938) be done first**

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Historic Data Trends

- Original budget amount none
- Request for FY02 $25K
- Performed by ERDC (CERL or EL)
- Proposed additional effort:
  - **To examine historic record for those parameters which are included within ECMI effort, to determine the degree to which the unusual climate extremes of CY2000 match or exceed the norms, thereby affecting water quality and other measured data elements**
  - **Provide these data to the research teams**
- Recommended by SAB (19 Jul 01)

Monitoring Enhancements

- Original budget amount
  $300K
- Request for FY02
  $325K
- Performed by ERDC EL
- Proposed additional effort:
  - Develop process for adding new indicators which may be monitored in the future by ECMI
  - Evaluate monitoring options for carbon cycling
- Recommended by SAB (19 July 2001)

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Repository Upgrades

- Original budget amount $50K
- Request for FY02 $110K
- Performed by ERDC EL and CERL
- Proposed additional effort:
  - **To improve accessibility of data repository and provide better means for SEMP project teams to enter their data in a timely manner**
  - **Includes web-enabling interface**

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Major SEMP Accomplishments

over the past year

- Closer working relationships
  - **Among the SEMP research teams**
  - **With Fort Benning EMD**
  - **With Fort Benning Range Control**
  - **With non-SEMP researchers at Fort Benning**
- Data Repository in regular use
  - **Receiving data from SEMP monitoring**
  - **Receiving data from research teams**
  - **Fort Benning accessing repository and using data**

Major SEMP Accomplishments

over the past year

- Publications
  - **Four papers published (or accepted) in refereed journals - from SEMP research teams**
  - **Seven Technical Reports and Special Reports from ERDC managers and researchers**
  - **Two Technical notes from ERDC monitoring**
- Presentations
  - **At least 12 oral or poster presentations by SEMP researchers (and students) at national or regional meetings**

Major SEMP Accomplishments

over the past year

- Research Coordination Meeting
  - **Held at Fort Benning in Nov 2001**
  - **Brought together all SEMP research teams**
  - **Discussed accomplishments, needs, and problems**
  - **Heard from 6 “outside” research projects**
- Technical Advisory Committee Meetings
  - **First in July 2001**
  - **Second in November 2001 in conjunction with RCM**
  - **TAC members visited each team’s field sites for orientation**

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Major SEMP Accomplishments
over the past year

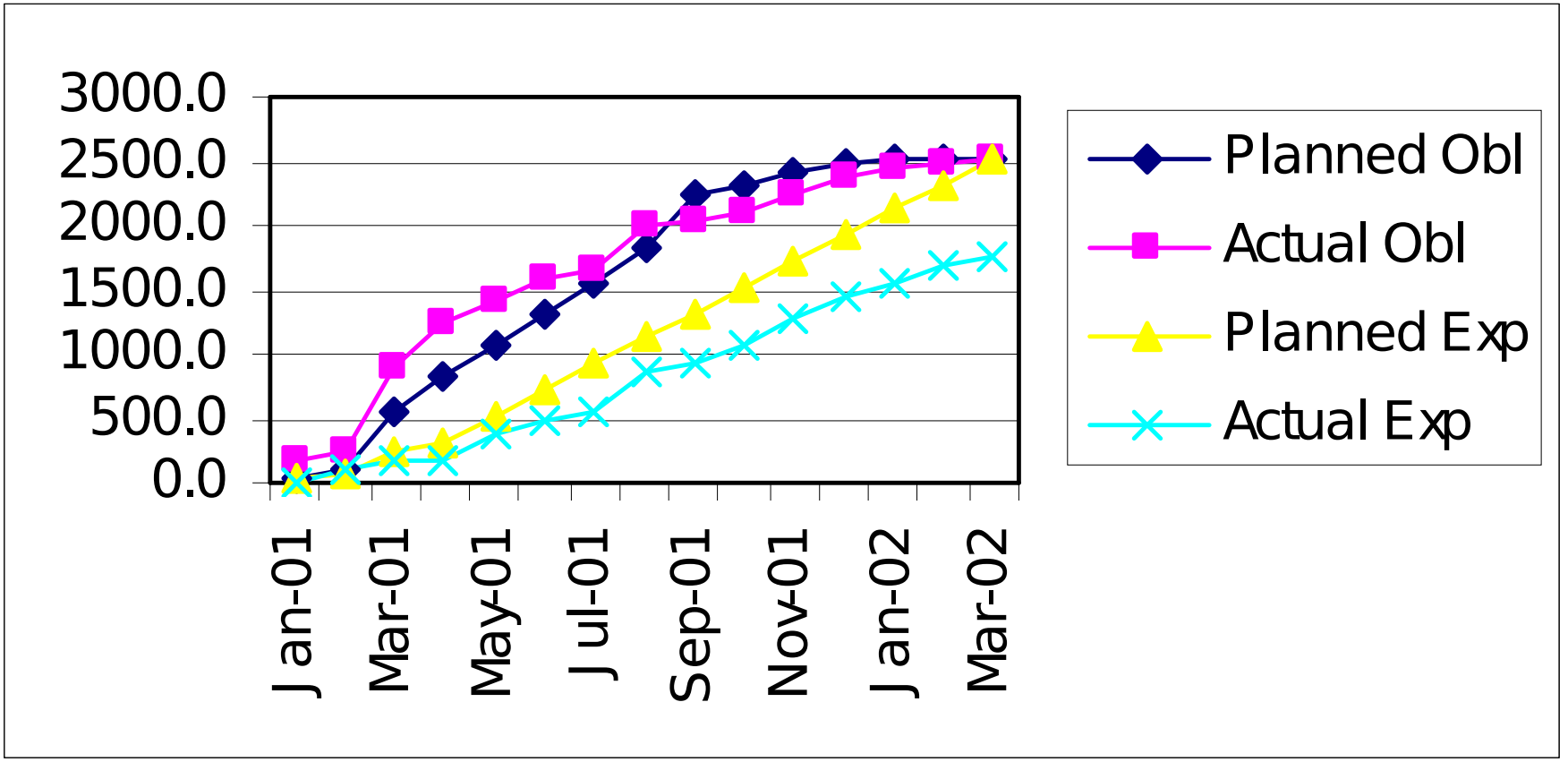
- Coordinating field site access at Fort Benning
  - **ERDC onsite coordinator scheduled 1500+ requests for visits to a study site**
  - **700+ required joint-use agreement with a military user**
  - **No delays of training because of SEMP use**
  - **No reportable accidents or injuries**
  - **Coordinator acts as liaison for all other research teams, for uniformity of process**

Major SEMP Challenges

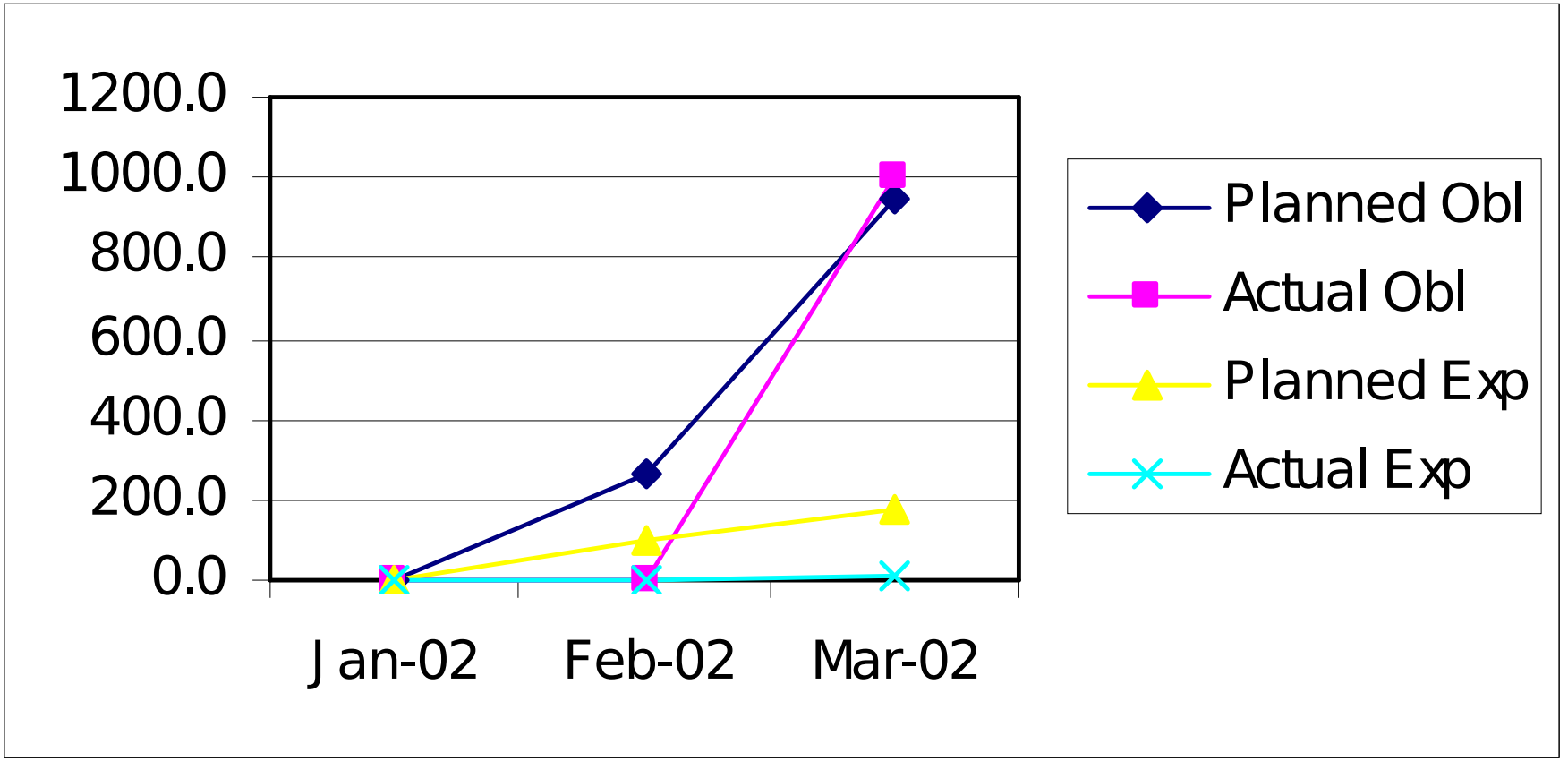
In the year ahead

- Execute disturbance-scale workshop
- Continue to improve cross-project integration within SEMP
- Initiate process for “Testbed” projects
- Increase level of external research project liaison with “outside” projects (SERDP and non-SERDP)
- Further encourage publication in refereed journals

FY01 Obligations/Expenditures
(As of 31 March 2002)



FY02 Obligations/Expenditures
(As of 31 March 2002)



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Priority for FY03 Budget Additions

1 - Develop Integration Strategy

2 - 1950s Air Photo Coverage

3 - Biogeochemical/Carbon Budget

4 - Monitoring Data Analysis

5 - Peer Reviews for Added Work